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## Self Views of African American Youth are Related to the Gender Stereotypes and Academic Attributions of Their Mothers

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### Abstract

We examined relations among African American mothers' ( $N = 392$ ) stereotypes about gender differences in mathematics, science, and reading performance, parents' attributions about their children's academic successes and failures, and their seventh and eighth grade children's academic self-views (domain-specific ability attributions and self-concept). Parents' stereotypes about gender differences in abilities were related to their ability attributions for their children's successes and failures within academic domains. Mothers' attributions, in turn, were related to children's attributions, particularly among girls. Mothers' attributions of their children's successes to domain-specific ability were related to the self-concepts of daughters, and failure attributions were related to domain-specific self-concepts of sons. The influences of parents' beliefs on young adolescents' identity beliefs are discussed.

### Keywords

stereotypes; gender; self-concept; causal attributions

Stereotypes about social groups are pervasive and powerful and shape our interactions with and expectations of others. In the United States, girls have been traditionally viewed as more skilled in verbal domains than boys, who are frequently viewed as more talented in mathematics and science. As described below, ample literature has shown that parents' perceptions and behaviors are shaped by stereotypes about gender differences in academic skills. The current study advances our understanding of the role of stereotypes in three ways. First, we directly measure the relation between parent reports of their own stereotypes and their beliefs about the degree to which domain-specific ability explains the academic outcomes of their children—a linkage not explored in prior research. Second, we examine stereotypes about differences in verbal skills, whereas most prior research on gender stereotypes has focused on math and science. Third, we examine these phenomena in an African American sample. We suggest that parents' beliefs about the causes underlying their children's academic performance (that is, their causal attributions) are one mechanism by which parents' gender stereotypes affect children's outcomes. We hypothesized that mothers' stereotypes about gender differences in achievement influence their causal attributions about their children's academic failures and successes, and in turn, mothers' achievement attributions influence children's own attributions and academic self-concepts in the domains of mathematics, science, and literacy.

### Parents' Gender Academic Stereotypes

Stereotypes are judgments about individuals based on their membership in a specific social group (Martin, Wood, & Little, 1990; Ruble, Cohen, & Ruble, 2001) and are sometimes

used to make attributions about others' behaviors (Reyna, 2000). Stereotypes often have a basis in reality (e.g., many Scandinavians are tall and blond), yet a wealth of research has shown that individual endorsement of stereotypes is a meaningful predictor of many cognitive, social, and emotional outcomes (McGarty, Yzerbyt, & Spears, 2002). Prior research--most of which has been conducted with White samples--shows that parents tend to view boys as better in mathematics and science and girls as better in reading and writing. Parents rate their sons as more competent than their daughters in mathematics and science, are more likely to buy mathematics and science-related toys for sons than for daughters, have lower mathematics-related expectations for daughters than for sons, and report helping daughters with mathematics and science more than sons (Andre, Whigham, Hendrickson, & Chambers, 1999; Bleeker & Jacobs, 2004; Herbert & Stipek, 2005). These views exist despite current research that shows no gender difference in mathematics performance during the elementary school years (Aud, Fox, & KewalRamani, 2010). Therefore, it is likely that stereotyping is a source of parents' perceptions of their children's abilities. In the above studies, results were based on comparisons of boys versus girls (and parents of sons versus parents of daughters), and stereotypes were inferred rather than measured directly. In the current study, we examine the extent to which parents' personal *endorsement* of gender stereotypes is related to their beliefs about their own children.

Theoretical support for the link between parents' stereotypes and their perceptions of their children comes from Eccles and colleagues' model of parenting (Eccles, et al., 1983). They suggest that parenting behaviors develop out of a combination of parents' general beliefs about development, including stereotypes, and beliefs that are specific to their children, such as performance attributions. Indeed, a growing body of literature shows that parents' endorsements of societal stereotypes are powerful predictors of their interpretations of their own children's behavior and achievement (Jacobs, Chhin, & Shaver, 2005; Wood, Kurtz-Costes, Rowley & Okeke-Adeyanju, 2010). In keeping with this model, we hypothesize that parents' stereotypes about gender differences in academic skills might shape their interpretations about the reasons underlying their children's academic successes and failures.

The majority of the studies on academic stereotypes have examined beliefs about mathematics and science performance, with little attention to parents' reading (or literacy) stereotypes. We found no published studies in which researchers directly assessed parents' stereotypes about gender differences in verbal abilities, and the scant literature on child gender differences in parents' beliefs about their own children's literacy skills is inconsistent. Some studies show that parents of elementary-school aged children view their daughters as more verbally skilled than sons (e.g., Eccles, 1983; Frome & Eccles, 1998), whereas other studies have found that parents did not rate girls as better in reading than boys, even when girls had higher reading achievement (Andre et al., 1999; Herbert & Stipek, 2005). One contribution of the current study is that mothers' endorsement of gender stereotypes was measured in the domains of mathematics, science, and literacy. An additional contribution is that we explored the role of parent attributions as a mechanism by which stereotypes might shape youths' achievement-related beliefs. We expected that mothers' stereotypes would be related to their causal attributions about their children's academic successes and failures, and that mothers' attributions, in turn, would be related to youths' own achievement-related beliefs.

## Causal Attributions as Parental Influences on Adolescents' Achievement-Related Beliefs

Classic attribution theory posits connections between perceptions of ability and attributions about performance outcomes (Graham, 1991; Weiner, 1979; 1985). For example, older youth and adults expect an inverse relationship between ability and effort: Given equal

performance, individuals who have exerted greater effort are assumed to have less ability than those who achieved an equal outcome with less effort (Nicholls, 1984). Attributions affect engagement, persistence, and future achievement because a student who perceives that failure was due to lack of ability is less likely to persist than a student who believes that failure was due to lack of effort (a controllable factor) or task difficulty (Weiner, 1985; Wigfield, 1988). Thus, attributing successes to ability and effort and attributing failure to lack of effort are associated with positive outcomes and greater subsequent motivation, whereas attributions of failure to lack of ability tend to be particularly detrimental (Wigfield, 1988). As Weiner (1985) argued, an attribution of failure to lack of ability inhibits motivation because ability is perceived as stable and uncontrollable.

The nature of academic stereotypes – they are stable and are based on beliefs about the abilities of members of a group – makes it likely that holders of these stereotypes make ability-based causal attributions for the performance of members of the stereotyped group (Kiefer & Shih, 2006; Reyna, 2000; Swinton, Kurtz-Costes, Rowley, & Adeyanju, 2011). One of our primary research questions was whether mothers who hold traditional gender academic stereotypes (i.e., boys are better than girls in math and science; girls are better in verbal domains) would apply these beliefs to their own children--for example, being more likely to explain verbal successes of daughters than verbal successes of sons as due to high verbal ability. Thus, as argued by Reyna (2000), we hypothesized that parents' stereotypes--which are their beliefs about *group* differences in ability--would be related to attributions about their own children (thus, influencing perceptions of an *individual*). We expected that mothers who endorse traditional gender stereotypes would be more likely to attribute boys' math/science successes to ability and girls' reading successes to ability than mothers who do not strongly endorse stereotypes. If African American mothers hold such gendered beliefs about boys and girls in general and if they apply those beliefs to their own children in particular, these attributions are likely expressed through behaviors that shape children's own attributions and their perceptions of their abilities. For instance, a parent who holds traditional gender stereotypes about academic skills might tell a son who has failed a math test that he will do better next time if he studies harder, whereas a daughter's math failure might be greeted with a comment that she is more capable in English than in math.

In the current study, we examined whether mothers' ability attributions about their children's math, science, and English successes and failures were related to their endorsement of traditional gender stereotypes, and whether mothers' attributions were related to youths' own achievement beliefs. We were especially interested in the ways that these relationships differed with regard to academic domain for mothers of boys and mothers of girls. Kiefer and Shih (2006) found that the attributions of college students in their sample were consistent with traditional stereotypes. That is, men were more likely than women to attribute poor performance to lack of ability on verbal tasks and women were more likely than men to attribute math failures to lack of ability. We found similar results in a recent study with African American adolescents. Consistent with traditional stereotypes, boys were more likely than girls to attribute their math successes to ability and their English failures to lack of ability (author reference). In the current paper, we extend this prior work by examining parents' gender academic stereotypes and their attributions about the academic successes and failures of their adolescent children as well as the relation between parents' attributions and youths' own academic beliefs. We hypothesized that parents' attributions about their children's math, science, and English performance would be related to the attributions and the domain-specific competence perceptions of their sons and daughters, with youths' school grades controlled.

## Achievement Beliefs in African American Families

Prior research on parents' gender stereotypes has been conducted with predominantly White, middle class samples (e.g., Jacobs, 1991; Pajares et al., 1999; see Herbert & Stipek, 2005 and Wood, Kurtz-Costes, Rowley, & Okeke-Adyanju, 2010 for exceptions). The current study's focus on African American families may complicate the findings of those studies given the potentially unique relationship between race and gender in African Americans. Although there is not strong empirical evidence to suggest that African American parents' gender academic stereotypes would differ from parents of other ethnic backgrounds, we consider this possibility for the following reasons. First, although girls receive higher grades than boys throughout primary and secondary school on average, national data show that these gender differences in achievement are more pronounced among African American children than among Whites (Aud et al., 2010). Thus, because of the academic excellence of Black girls, African American parents might hold less traditional gender stereotypes related to children's math and science abilities. Second, race may be more salient than gender as a social identity for some African American parents (Settles, 2004), leading to less focus on gender as a significant factor related to academic ability. Thus, these parents would be less likely than others to report traditional gender stereotypes. Moreover, these same conditions may also mean that gender stereotypes will not be strongly related to parents' views of their own children.

## Study Aims

In the current study, a model was tested linking mothers' gender stereotypes about mathematics, science, and literacy (reading and writing) ability, their attributions for their own children's domain-specific successes and failures, and children's attributions and domain-specific academic self-concept. The study extends previous research in several ways. To our knowledge, no prior research has directly assessed the relation between parents' gender academic stereotypes and their causal attributions for their own children's academic successes and failures. Second, few prior studies have examined relations between parents' attributions about their children's performance and children's own achievement-related beliefs. In addition, although a large body of research has focused on gendered beliefs regarding mathematics, little research has examined gendered beliefs about literacy. Finally, very few prior studies have examined the influence of parents' gender stereotypes in African American samples. Our hypotheses were as follows:

1. Mothers' gender stereotype endorsement would be related to their attributions about their own daughters' and sons' academic successes and failures. For example, in contrast to mothers who did not hold gendered beliefs, mothers who endorsed traditional gender stereotypes in literacy domains would be more likely to attribute literacy success among their daughters to ability, and they would attribute the literacy failures of their sons to lack of ability.
2. Mothers' attributions would reflect traditional gender academic stereotypes: Literacy failures of boys, and mathematics and science failures of girls would be more frequently attributed to lack of ability than the literacy failures of girls, and mathematics and science failures of boys, respectively. In contrast, mathematics and science successes of boys, and literacy successes of girls would be attributed to ability with greater frequency than the reverse.
3. Mothers' attributions about the importance of domain-specific ability in shaping their children's academic outcomes would be associated with children's domain-specific attributions and children's academic self-concepts. This relation would appear within gender and within academic domain. For instance, mothers who

attributed their daughters' literacy success to ability would be more likely to have daughters who reported high literacy self-concept and attributions of literacy success to literacy ability, and these daughters would be less likely to attribute literacy failures to lack of literacy ability.

## Method

### Participants

A sample of 392 African American mother/student dyads (233 girls, 159 boys) provided data for this study. The sample resulted from merging two samples of African American youth and their parents who had provided data on the variables used in the current report. Given our focus on gender, we only included data from families for whom the participating parent was the child's mother. Both of the larger projects were longitudinal studies focused on identity development and achievement motivation in African American youth. For the current study, we used data that came from a single wave in each study, coinciding with the students' seventh- or eighth-grade school year.

The Adolescent Identity Project included 253 African American youth who were initially recruited in Grades 7 and 8 and were subsequently followed into high school (Grades 11 and 12). Of those 253 youth, caregivers of 196 participated, and 171 of those caregivers were mothers. This subsample included 100 girls and 71 boys ( $M_{\text{age}} = 13.8$  years;  $SD = 0.68$ ). Approximately 67% of the African American 7<sup>th</sup> and 8<sup>th</sup> grade students who were invited to participate returned a signed parental consent document; of those, 97% ( $N = 253$ ) agreed to participate.

Students in the Youth Identity Project were recruited when they were in fifth grade and participated again in Grades 7, 10, and 12. Data from the seventh grade assessment were used in the current study. Of the 298 Youth Identity students who participated in Grade 7, the caregivers of 251 also participated that year, and 221 of them were mothers. This subsample included 133 girls and 88 boys ( $M_{\text{age}} = 13.0$  years,  $SD = .68$ ). In the Youth Identity Project, 78% of African American fifth-grade students invited to participate returned signed consent forms; of those, 97% ( $N = 381$ ) agreed to participate. The retention rate for youth between Waves 1 and 2 was 79%.

Across the entire sample, median values of mother-reported annual household income and maternal education were \$30,000 to \$39,000 and "some college," respectively, although the full ranges (under \$10,000 to above \$100,000; less than high school to Ph.D., M.D., or other doctoral degree) were reported for each of those variables. All participating students were enrolled in schools within two school districts (one urban; one rural) in the southeastern region of the United States. Mothers and students self-identified as Black/African American. At the time of data collection, 249 students were in Grade 7 and 143 were in Grade 8.

### Procedures

Similar recruitment procedures were used for both studies. Letters detailing the project aims were distributed to students at school. The letter contained information for the parents about the study and an invitation for the youth and a caregiver (parent) to participate, along with an enclosed stamped and addressed envelope for a response. Reminder phone calls and repeat mailings were used to increase the final response rate.

Student surveys were completed at school in small groups at times and locations that were convenient for school personnel. The instructions were read aloud by a trained research assistant. The questionnaires were completed in a single, thirty-minute session. At the close of the session, the research assistant thanked the group and gave each student a small gift.

Parent questionnaires were mailed to the students' homes with a return-addressed, stamped envelope. Once the parent questionnaires were received in the lab, a thank you note and a \$20 gift card for a local business were mailed to the parent. Students' grades were obtained from school record data at the close of the academic year.

## Measures

Parent questionnaires included measures of gender academic stereotypes, the mother's attributions for the child's academic successes and failures, and family demographic information. Each student completed measures of perceived competence and attributions for academic success and failure. Grades were obtained from school records at the end of the academic year. Additional data were collected that are not included in this report.

**Mothers' Gender Stereotypes**—Rather than use a direct measure of stereotypes, which might encourage parents to under-report their gender-based beliefs, mothers' beliefs about the competence of boys and girls in academic domains was used as a proxy (Rowley et al., 2007). These beliefs were assessed by visual analogue scales. Mothers rated the performance of boys and girls in mathematics, science, reading, writing, and non-academic domains (e.g., sports, music). Respondents placed a mark on a 100-millimeter line to indicate how well that group of children (i.e., boys; girls) performs within a particular domain, where the 0 millimeter mark indicated “not well at all” and the 100 millimeter mark represented “very well.” All items for each gender appeared on a single page. Racial groups were also evaluated, and sets of questions were ordered so that assessments of boys and girls were not on contiguous pages. The distance in millimeters from the left anchor of the scale to the parent's mark was measured (range = 0 to 100). Item scores were averaged to construct group competence scores of girls' and boys' mathematics/science skills, and girls' and boys' literacy skills. Stereotype scores were constructed by subtracting the score for the negatively-stereotyped group from the positively-stereotyped group. Thus, math/science stereotype scores were created by subtracting mothers' ratings of girls' ability in mathematics and science from boys' math and science abilities, and verbal stereotype scores were created by subtracting mothers' ratings of boys from their ratings of girls. Using this procedure, positive scores indicated traditional stereotypes, scores near zero indicated egalitarian beliefs, and negative scores represented non-traditional beliefs.

**Mothers' Causal Attributions**—Eight items were used to assess mothers' attributions for their child's academic successes and failures. One success and one failure item were used for each of the following four domains: mathematics, science, writing, and language arts/reading. For example, the science success item was “When my child gets an excellent grade on a science project, it is because s/he is talented in science;” the mathematics failure item read: “When my child does poorly on a mathematics test, it is because s/he isn't good at math.” For each item, mothers rated on a 4-point scale (1 = *not at all likely*; 4 = *extremely likely*) the likelihood of the child's ability in explaining success or failure within that situation. Items also were used to assess mothers' attributions of their child's academic outcomes to effort or to teacher characteristics, but those data are not included in this report.

Four scores were constructed: success ability for math/science (the average of the mathematics and science success items); failure ability for math/science; success ability for literacy (the average of writing and language arts success items); and failure ability for literacy.

**Demographic Information**—Mothers reported household income on an 11-point scale ranging from *less than \$10,000 per year* to *more than \$100,000 per year*. Maternal education



was reported on a 10-point scale that ranged from *some high school* to *Ph.D., M.D., or other doctoral degree*.

**Students' Academic Self-Concept**—Youth ranked their perceptions of their own competence compared to age mates in various domains by circling a figure in a column of twenty-five stick figures for each item (Nicholls, 1978). Anchors at the top and bottom of each item were “the best” and “the worst,” respectively. Self-concept was rated in mathematics, science, writing, and language arts. Items were scored according to the child's ranking (i.e., from 1 to 25), with higher scores indicating greater perceived competence.

**Students' Causal Attributions**—Students reported the reasons underlying their successes and failure in mathematics, science, reading, and writing. Student attributions were measured as described above for mothers, with items reading “I” rather than “my child.” As was the case for mothers, responses to individual items were aggregated in order to create four composite scores: the extent to which the student rated mathematics and science successes as due to ability in those domains (i.e., “math/science success ability attributions”); the extent to which English successes were due to verbal ability (i.e., “literacy success ability”); the extent to which math and sciences failures were due to lack of math/science ability (i.e., “math/science failure ability”); and the extent to which English failures were viewed as due to lack of verbal ability (i.e., “literacy failure ability”).

**School Grades**—Year-end grades (ranging from 0 to 100) in mathematics, science, and language arts (literacy) were obtained from school records.

## Results

### Preliminary Analyses

Descriptive data for all study variables appear in Table 1. As described above, stereotype scores were constructed by subtracting mothers' ratings of boys' literacy abilities from their ratings of girls' literacy abilities, and by subtracting mothers' ratings of girls' math/science abilities from their math/science ratings of boys. For instance, if a mother's average rating of boys on math/science items was 68, and the mother's math/science rating of girls was 57, she would have a math/science stereotype score of 11. One sample *t*-tests confirmed that mothers' gender academic stereotypes in literacy were significantly different from zero, which would represent completely egalitarian perceptions of boys' and girls' performance. Mothers rated girls as much better than boys in literacy ( $M = 22.99$  on the 100-point scale) and approximately equal to boys in math/science ( $M = -3.34$ ). Large standard deviations for literacy (20.86) and math/science (19.28) suggest considerable variability in these views.

### Analytic Strategy

Hierarchical multiple regressions were used to evaluate our primary hypotheses. The first set of regressions used mothers' ability attributions (success and failure) for their children as the dependent variables and mothers' domain-specific stereotypes as well as the interaction of stereotypes and child gender as predictor variables. Control variables and stereotype scores were entered simultaneously in the first step. The interaction term was entered in the second step. Household income, grade in school (i.e., Grade 7 versus 8), and course grades were entered as control variables. Significant interactions were probed by running similar regressions while omitting gender and the interaction term and by calculating the equations separately for girls and boys. Support for Hypothesis 1 would appear with significant gender  $\times$  stereotype interactions in which the relation between stereotypes and attributions would differ according to the child's gender. For example, the hypothesized relation between mothers' stereotypes and their attributions would be supported within the domain of literacy

if mothers' literacy stereotype endorsement was positively related to success ability attributions among parents of daughters, and negatively related to success ability attributions among parents of sons. In contrast, attributions of literacy failure to lack of ability would be positively related to literacy stereotypes among parents of sons, and negatively related to literacy stereotypes among parents of daughters.

Results of the above regression analyses also allowed us to test Hypothesis 2—namely, that mothers' attributions would be consistent with traditional stereotypes. According to that hypothesis, mothers of sons would be more likely to attribute their children's math/science successes to ability and less likely to attribute math/science failures to lack of ability than would mothers of daughters. The reverse relations were expected for literacy attributions. Therefore, significant gender effects in the regression analyses described above would confirm these hypotheses.

Hypothesis 3 was tested with a second set of regressions that examined the relationship between mothers' ability attributions for their children and their children's own attributions and self-concepts, controlling for mothers' stereotypes. This analysis was hierarchical, with all covariates and mothers' stereotypes entered simultaneously in the first step, and mothers' success and failure ability attributions entered in the second step. Because of the significant interactions involving gender found in the first set of analyses, these regression equations were calculated separately by child gender. (Thus, analyses were conducted separately for parents of daughters and parents of sons.) For each child gender, one equation was calculated for each of the six dependent variables: literacy failure attributions, literacy success attributions, literacy self-concept, math/science failure attributions, math/science success attributions, and math/science self-concept. Hypothesis 3 would be supported if each parent attribution significantly predicted the respective youth outcome variable.

### Mothers' Gender Stereotypes and Attributions

**Mothers' Literacy Attributions**—The first set of regressions examined the association between mothers' stereotypes about gender differences in literacy skills and mothers' attributions for their own children's literacy successes and failures to ability or lack thereof. The results of these analyses are in Table 2. As described above, child's grade in school, household income, language arts grade, child gender, and mothers' literacy stereotypes were entered in the first step; the child gender x mother stereotype interaction was entered in the second step. Both the equation predicting mothers' literacy success attributions and the equation predicting literacy failure attributions were significant,  $F(6, 354) = 5.42$  and  $5.52$ , respectively,  $p's < .001$ . Because the relationship between mothers' literacy stereotypes and their literacy success attributions was expected to be positive for parents of daughters but negative for parents of sons, our first focus was on the Gender x Stereotype interaction in each equation. As anticipated, the interaction of child gender and parent stereotypes was significant both in the equation predicting mothers' literacy success ability attributions and mothers' literacy failure attributions,  $\beta = .291$  and  $.309$ , respectively,  $p's = .001$ .

Separate regressions were conducted to probe the interactions of child gender and parent literacy success and failure attributions. The results showed that, as hypothesized, mothers' literacy stereotypes were positively related to success ability attributions for their daughters ( $\beta = .186$ ,  $p = .007$ ) and negatively related to success ability attributions for sons ( $\beta = -.191$ ,  $p = .024$ ). Conversely, mothers' endorsement of literacy stereotypes was negatively related to their attributions of their daughters' literacy failures to lack of ability, and positively related to lack of ability attributions for sons,  $\beta = -.171$  and  $.192$ ,  $p = .013$  and  $.022$ , respectively. Mothers who more strongly endorsed traditional literacy stereotypes (i.e., viewed girls as better than boys) were more likely to attribute their daughters' literacy successes to ability and were less likely to attribute their sons' literacy successes to ability;



these parents were also less likely to attribute daughters' literacy failures to lack of ability and were more likely to attribute son's literacy failures to lack of ability. These results were independent of their children's actual language arts achievement.

In addition to these significant Gender x Stereotype interactions, the main effect of Gender was significant in the literacy success equation, providing some support for Hypothesis 2. As anticipated, Gender was negatively related to mothers' literacy success attributions,  $\beta = -.118$ ,  $p = .029$ . Because Gender was coded as "1" for boys and "0" for girls, the negative coefficient showed that mothers of daughters were more likely than mothers of sons to attribute their child's literacy successes to literacy ability. The main effect of Gender was nonsignificant in the literacy failure equation.

**Mothers' Math/Science Attributions**—Similar sets of regressions were run to examine the relationships between mothers' math/science stereotypes and their ability attributions for their children's math and science successes and failures. The child's grade in school, household income, math and science grades, child gender, and mothers' math/science stereotypes were entered in the first step; the child gender x parent stereotype interaction was entered in the second step. The equation predicting math/science success attributions was significant,  $F(7, 353) = 6.48$ ,  $p < .001$ . The anticipated main effect of Gender approached significance with a positive beta weight indicating that mothers of sons were more likely than mothers of daughters to attribute children's math/science successes to math/science ability,  $\beta = .092$ ,  $p = .08$ . As predicted, the interaction of child gender and parent stereotypes was significant in predicting success attributions,  $\beta = .226$ ,  $p = .001$ .

Regression equations were calculated separately for mothers of boys and mothers of girls to evaluate the child gender by stereotype interaction in predicting math/science success ability attributions. For mothers of girls, the relationship between stereotypes and their math/science success ability attributions was negative ( $\beta = -.275$ ,  $p < .001$ ). For mothers of boys, the relationship was positive but non-significant,  $\beta = .105$ ,  $p = .192$ . Thus, among mothers of girls, those who endorsed more traditional math/science stereotypes were less likely to attribute their daughters' math/science successes to ability than were mothers of girls reported less traditional math/science stereotypes. This effect was independent of their daughters' math/science achievement.

The regression analysis on mothers' math/science failure ability attributions was also significant,  $F(7, 353) = 6.19$ ,  $p < .001$ . However, the anticipated interaction of child gender and parent stereotype was nonsignificant. Consistent with Hypothesis 2, the main effect of Gender was significant, reflecting that parents of daughters were more likely than parents of sons to attribute their child's math/science failures to lack of ability,  $\beta = -.151$ ,  $p = .005$ .

In summary, mothers who more strongly endorsed traditional literacy stereotypes (i.e., viewed girls as better than boys) were more likely to attribute their daughters' literacy successes to ability and were less likely to attribute their sons' literacy successes to ability. Literacy failures were similarly interpreted in manners consistent with stereotypes among mothers who endorsed those stereotypes. Mothers' stereotypes were also related to their success attributions for the domains of math and science. Mothers with traditional stereotypes (i.e., favoring boys in mathematics and science) were less likely to attribute their daughters' math/science successes to ability than were mothers with less traditional views. Some support was also provided for Hypothesis 2. Mothers were more likely to attribute literacy failures to lack of literacy ability for sons than for daughters, and were more likely to attribute math/science successes to math/science ability for sons than for daughters. Conversely, math/science failures were more likely to be attributed to lack of math/science ability for daughters than for sons.

## Mothers' Attributions and Children's Achievement-Related Beliefs

Next, regression analyses were used to examine the relationship between mothers' beliefs (i.e., stereotypes and attributions) and youths' achievement-related beliefs. Six student-reported variables were the dependent variables in these analyses: Students' failure ability attributions for literacy, success ability attributions for literacy, failure ability attributions for math/science, success ability attributions for math/science, literacy self-concept, and math/science self-concept. Control variables (household income, grade in school, and students' grades), mothers' stereotypes, and mothers' domain-specific attributions for both success and failure were entered simultaneously. These analyses were run separately by child gender and academic domain. Table 3 contains the results of these regressions.

**Students' Literacy Attributions and Self-Concept**—The equations predicting girls' literacy success attributions, literacy failure attributions, and literacy self-concept were all significant,  $F(6, 205) = 5.65, 2.99, \text{ and } 6.30$ , respectively, all  $p$ 's  $< .01$ . Girls' literacy success attributions were significantly predicted by their mothers' reported literacy success and failure attributions,  $\beta = .262, p < .001$  and  $-.175, p = .011$ , respectively. In the equation predicting girls' literacy failure attributions, the direction of effects was as anticipated (i.e., a negative beta weight for mothers' literacy success attributions and a positive beta weight for failure attributions), but the results only approached significance,  $\beta = -.130, p = .067$  and  $.136, p = .055$ , respectively. In the equation predicting girls' literacy self-concept, mothers' literacy success attributions emerged as a significant predictor,  $\beta = .267, p < .001$ . Mothers' literacy failure attributions were nonsignificant.

The equation predicting boys' literacy success attributions was nonsignificant,  $F(6, 142) < 2.0$ . The equation predicting boys' literacy failure attributions was significant,  $F(6, 142) = 2.95, p = .01$ ; however, neither of the maternal attribution variables was significant as a predictor in this equation. The equation predicting boys' literacy self-concepts was also significant,  $F(6, 142) = 2.72, p = .016$ . In that equation, mothers' literacy failure attributions were negatively related to their sons' literacy self-concept—thus, with sons' literacy achievement controlled, mothers who were more likely to believe that sons' literacy failures were due to lack of ability had sons who perceived that they had lower literacy ability relative to peers ( $\beta = -.280, p = .001$ ). With other variables controlled, mothers' literacy success attributions were unrelated to their sons' literacy self-concepts.

**Students' Math/Science Attributions and Self-Concept**—The three equations predicting girls' math/science success attributions, math/science failure attributions, and math/science self-concept were significant,  $F(7, 204) = 4.30, 4.01, (p$ 's  $< .001)$ , and  $3.41, p = .002$ , respectively. With students' math/science ability controlled, mothers' math/science success attributions were positively related to their daughters' math/science success attributions,  $\beta = .271, p = .001$ . With mothers' success attributions entered, mothers' math/science failure attributions did not have an additional effect on daughters' success attributions. In the equation predicting girls' math/science failure attributions, both mothers' success and failure attributions in the domains of math and science were significant predictors,  $\beta = -.151, p = .034$  and  $\beta = .192, p = .006$ , respectively. Mothers' math/science success attributions were also related to their daughters' math/science self-concept,  $\beta = .186, p = .01$ . With mothers' math/science success attributions in the equation, math/science failure attributions did not explain additional variance in daughters' math/science self-concept.

For the three equations predicting boys' math/science beliefs, the regression analysis predicting math/science success attributions approached significance,  $F(7, 137) = 2.00, p = .059$ . The equations predicting math/science failure attributions and math/science self-

concept were significant,  $F(7, 137) = 3.46$ , and  $3.73$ ,  $p = .002$  and  $.001$ , respectively. As expected, mothers' math/science success attributions were positively related to their sons' math/science success attributions,  $\beta = .271$ ,  $p < .001$ . In the equation predicting boys' math/science failure attributions, mothers' failure attributions approached significance as a predictor,  $\beta = .162$ ,  $p = .059$ . Mothers' math/science failure attributions were negatively related to their sons' math/science self-concepts,  $\beta = -.281$ ,  $p = .001$ .

In summary, in most analyses, mothers' attributions were associated with children's attributions as expected (e.g., with youths' domain-specific achievement controlled, parent success attributions were positively associated with child success attributions and self-concept, and were negatively associated with child failure attributions). Relations between mothers' and children's beliefs were stronger among mother-daughter pairs than between mothers and sons, particularly in the domain of literacy. Because mothers' success and failure attributions were correlated within each domain, our procedure of entering both attributions simultaneously in the regression analyses was conservative, and therefore we chose to also report results that were significant at a more lenient alpha level of  $< .09$ . Given the simultaneous entry of the two attribution variables, it is not surprising that in some of the equations only one maternal attribution was significantly related to the child outcome variable. However, overall, the results provide consistent evidence linking mothers' attributions to students' beliefs: With students' domain-specific achievement controlled, in ten of the twelve equations at least one maternal attribution (i.e., for success or ability) was related to the child's belief in the expected direction. The two exceptions were boys' literacy attributions.

## Discussion

Gender differences in career choices, such as the overrepresentation of men in engineering and information technology, continue to persist (National Science Foundation, 2009). Pervasive stereotypes about gender differences in achievement by academic domain are one potential source of these disparities. Nevertheless, relatively little research has explored the mechanisms by which parents' stereotypes about gender differences in academic skills shape children's academic motivation. Our results contributed to this literature by exploring gender stereotypes in an African American sample, by investigating literacy in addition to the more extensively studied domains of mathematics and science, and by examining the effects of mothers' stereotypes on mothers' and children's tendencies to attribute children's academic performance to ability. Our investigation of these associations within gender-stereotyped domains allowed us to explore the influence of mothers' beliefs in domains in which girls and boys were both positively and negatively stereotyped.

We confirmed that with child achievement controlled, mothers' gender academic stereotypes are related to their attributions for their children's academic successes and failures in the domains of literacy, and mathematics and science. As expected, when mothers favored the gender group of the target child, they were more likely to attribute his or her academic successes to ability. Greater support for the parent stereotype-attribution link was found within the domain of literacy than within the domain of math/science. We also found that parents' failure ability, but not success ability attributions, reflected traditional stereotypes. That is, in comparison to the other gender group, parents were more likely to attribute boys' literacy failures and girls' math/science failures to lack of ability. In general, our results also showed consistent relationships between parents' ability attributions and the self-beliefs of their children. These relationships were more consistent among parents of girls than parents of boys.

## Gender Stereotypes in African American Parents

As noted, this study was one of the first to confirm that on average, mothers endorse traditional literacy stereotypes that girls are better than boys in reading and writing. Both mothers' stereotype reports and their attributions regarding their children's reading and writing failures were consistent with the social stereotype that girls are more talented than boys in verbal skills. Thus, girls were viewed, as a group, as more talented in verbal skills than boys, and when evaluating the literacy abilities of individual youth, mothers were more likely to attribute literacy failure to lack of ability for sons than for daughters. The latter results are particularly noteworthy given that youths' achievement was controlled in the analyses. These results illustrate one mechanism (i.e., causal attributions about the reasons underlying academic failure) by which evaluations of a social group may influence interpretation of the behaviors or attributes of an individual.

Results related to mathematics and science, though, were not as straightforward. Although prior research with middle class European American families showed that, on average, parents endorse traditional stereotypes about gender differences in mathematics and science abilities (Bleeker & Jacobs, 2004; Jacobs, 1991; Jacobs, Chhin, et al., 2005), average scores on mathematics and science competence beliefs (i.e., stereotypes) suggested that the African American mothers in our study viewed girls as equal to or slightly more capable than boys in mathematics and science. It is unclear whether this result reflects race differences in mothers' beliefs, or whether it represents historical changes in societal perceptions. Increasing representation of women in undergraduate and professional programs may relate to more favorable views of girls' abilities in technical fields and a softening of these societal stereotypes (US Census Bureau, 2011). Although studies have not examined race differences in parents' endorsement of math/science stereotypes, there is some evidence from research with adolescents that African American youth are more likely than European American youth to report non-traditional gender stereotypes in mathematics and science. One study of young adolescents showed that whereas White students tend to rate boys and girls as relatively similar in math/science ability, Black girls (but not boys) rate girls as much better in math/science than boys (Rowley et al., 2007). Similarly, another study of African American middle school students demonstrated that both boys and girls rated girls as better than boys in math/science ability (Evans et al., 2011). Further inquiry into the question is needed given the vulnerable position of African American boys in academic domains (Noguera, 2003; Roderick, 2003).

Although the African American parents in our sample did not endorse the stereotype that boys are more talented than girls in mathematics and science on our stereotype measure, their attributions for their children's academic failures were consistent with traditional stereotypes. That is, with children's achievement controlled, parents attributed math/science failures to lack of ability more often for daughters than for sons.

## Social Stereotypes, Attribution Theory, and Adolescents' Perceptions of Competence

In addition to confirmation of traditional gender academic stereotypes among African American mothers, our results showed a fairly consistent pattern of associations between mothers' stereotypes and their causal attributions about their sons' and daughters' academic failures and successes, and of relations between parent attributions and children's beliefs. In line with Eccles' and colleagues (1983) model of parenting, our results showed that mothers' child-specific beliefs--in other words, their attributions about their children's academic successes and failures--were related to children's own self-system beliefs with their achievement controlled in the analyses. Relations between mothers' and children's beliefs were more consistent among daughters than among sons.

Mothers' beliefs about their children's abilities are conveyed directly and indirectly, blatantly and subtly. For instance, a parent's choice of a science kit as a birthday gift, parent behaviors while children are completing homework, and parents' encouragement or discouragement of children to register for specific courses are all ways in which their beliefs are conveyed to their children (Bhanot, & Jovanovic, 2005; Jacobs, Davis-Kean, Bleeker, Eccles, & Malanchuk, 2005). The current results show that in African American families, daughters are particularly likely to hold beliefs about their own academic skills--both in their reported perceptions of competence and their causal attributions about their academic successes and failures--that are related to the gendered beliefs of their mothers.

The lack of relations found between mothers' attributions and boys' self-beliefs was surprising and counter to our hypotheses. These results could reflect gender differences in the parent-child relationship. It is possible that the mothers in our sample may have spent more time and communicated more openly with daughters than with sons. An alternative explanation is that race might be more salient than gender as a social identity among African Americans boys (Evans et al., 2011). In that case, boys in the current sample may have been less attentive than girls in the sample to the gendered beliefs of their mothers.

### Study Limitations and Conclusion

A significant limitation of the current study is that data come from a single time point, limiting conclusions that can be drawn about causality. There is good reason to expect that causal relations between parent and child beliefs are bi-directional (Scherr, Madon, Guyll, Willard, & Spoth, 2011). Parents' experiences with their own sons or daughters undoubtedly influence their views of girls and boys more generally, and stereotypes, attributions, and competence perceptions are probably interconnected in complex ways. For instance, because of social stereotypes, a girl might perceive herself as less capable in science than in English; her competence perceptions might lead to a devaluing of the domain of science, leading to less effort and eventually, less ability. Her academic choices and resulting skills might then reinforce her mother's stereotypes about gender differences in science abilities, and also lead her mother to attribute her science failures to lack of ability. Longitudinal research and research examining students' values and academic choices is needed to more clearly establish the patterns of causality among these variables. Longitudinal designs would permit examination of the developmental trajectories of motivational beliefs and attitudes among African American youth as they enter adolescence, a time when many youth show declines in motivation and achievement.

In conclusion, parents play important roles in shaping adolescents' developing self-perceptions. Although it is clear that parents' views of their children's academic abilities are shaped by their children's academic performance, these views are also informed by their endorsement of social group stereotypes. These stereotypes shape how parents interpret their own children's academic successes and failures and how their children interpret their own performance. As Weiner and others have illustrated, individuals' attributions about the causal factors driving achievement outcomes have a strong motivational influence on achievement striving (Graham, 1991; Nicholls, 1984; Swinton et al., 2011; Weiner, 2005). Whereas attributions of success to ability lead to engagement, persistence, and greater achievement, attributions of failure to lack of ability are associated with the most negative long-term motivational and achievement outcomes (Kiefer & Shih, 2006; Weiner, 2005; Wigfield, 1988). Thus, mothers' gender academic stereotypes might have far-reaching implications for their children. Finally, although mothers' beliefs were related in predicted ways to the achievement-related beliefs of daughters, association were weaker for sons. Future research should explore the ways in which the social identities of race and gender interact in shaping the development of personal identities.



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**Table 1**

Means and Standard Deviations for Mothers' and Students' Attributions, Academic Self-Concept, and School Grades

	Boys	Girls	Total
Mothers' Attributions			
Literacy Success Ability <sup>a</sup>	2.61 (.72)	2.81 (.80)	2.73 (.77)
Literacy Failure Ability	1.75 (.71)	1.68 (.68)	1.71 (.70)
Math/Science Success Ability	2.69 (.76)	2.66 (.77)	2.67 (.77)
Math/Science Failure Ability	1.55 (.67)	1.68 (.72)	1.63 (.70)
Child Attributions			
Literacy Success Ability	2.92 (.75)	2.99 (.75)	2.96 (.75)
Literacy Failure Ability	1.80 (.74)	1.79 (.82)	1.80 (.79)
Math/Science Success Ability <sup>a</sup>	2.93 (.67)	2.79 (.72)	2.85 (.70)
Math/Science Failure Ability	1.72 (.71)	1.83 (.78)	1.78 (.75)
Academic Self-Concept			
Literacy	17.25 (4.58)	17.37 (4.85)	17.32 (4.74)
Math/Science <sup>a</sup>	18.15 (4.90)	17.09 (4.55)	17.52 (4.71)
Grades			
Language Arts <sup>a</sup>	78.39 (9.94)	81.86 (9.91)	80.45 (10.05)
Math/Science <sup>a</sup>	78.75 (10.94)	82.76 (9.66)	81.14 (10.04)
	<i>n</i> = 159 <sup>b</sup>	<i>n</i> = 233 <sup>b</sup>	<i>n</i> = 392 <sup>b</sup>

<sup>a</sup>Scores for boys and girls differed at  $p < .05$ .

<sup>b</sup>Some cells had fewer cases because of non-systematic missing data.

**Table 2**

Multiple Regressions of Mothers' Gender Stereotypes and Achievement Attributions (N = 360).

	<u>Literacy Attributions</u>		<u>Math/Science Attributions</u>	
	Failure Ability	Success Ability	Failure Ability	Success Ability
	$\beta$	$\beta$	$\beta$	$\beta$
Step 1				
Grade	.001	.03	.01	.11 *
Income	-.13 *	.06	-.07	.02
Grades: Language Arts	-.15 *	.16 *	na	na
Grades: Math	na	na	-.19 **	.17 *
Grades: Science	na	na	-.12	.09
Child Gender	.07	-.12 *	-.14 **	.07
Stereotype	-.02	.05	.10	-.14 **
R <sup>2</sup>	.05 **	.06 **	.10 **	.07 **
Step 2				
Grade	-.01	.03	.02	-.11
Income	-.13 *	.06	-.07	.02
Grades: Language Arts	-.13 *	.14 **	na	na
Grades: Math	na	na	-.20 **	.18 **
Grades: Science	na	na	-.11	.06
Child Gender	-.13	.07	-.15 **	.09
Stereotype	-.16 *	.18 **	.17 **	-.28 **
Gender X Stereotype	.31 **	-.29 **	-.11	.23 **
R <sup>2</sup>	.09 **	.08 **	.11 **	.10 **

Note: All coefficients are standardized.

\*  
 $p < 0.05$ ;\*\*  
 $p < 0.01$ .

**Table 3**  
Multiple Regression Results Relating Mothers' Attributions to Youths' Attributions and Self-Concept by Child Gender.

	Literacy			Math/Science		
	Child Failure Ability	Child Success Ability	Academic Self-Concept	Child Failure Ability	Child Success Ability	Academic Self-Concept
	$\beta$	$\beta$	$\beta$	$\beta$	$\beta$	$\beta$
<b>Girls</b>						
Grade	-.054	.074	-.001	.083	.009	-.162*
Income	-.021	-.117	.009	-.067	-.066	-.011
Grades: Language Arts	-.148*	.115	.208**	Na	Na	na
Grades: Math	Na	na	Na	-.185*	.143	.073
Grades: Science	Na	na	Na	.067	.074	.062
Mothers' Stereotype	.084	-.020	-.052	-.024	-.024	.063
Mothers' Failure Attributions	.136#	-.175*	-.091	.192**	.051	-.110
Mothers' Success Attributions	-.130#	.262**	.267**	-.151*	.271**	.186**
R <sup>2</sup>	.08**	.14**	.16**	.12**	.13**	.11**
<b>Boys</b>						
Grade	.186*	.056	.035	.127	.146	.096
Income	-.097	-.048	.024	-.004	-.170	-.139
Grades: Language Arts	-.113	-.029	-.029	Na	Na	na
Grades: Math	na	Na	Na	-.166	.160	.089
Grades: Science	na	Na	Na	-.099	-.024	-.139
Mothers' Stereotype	.097	-.081	-.042	-.040	.048	.245**
Mothers' Failure Attributions	.118	-.155	-.280**	.162#	-.142	-.281**
Mothers' Success Attributions	.012	.050	.077	-.044	.017	.046
R <sup>2</sup>	.11**	.04	.10*	.15**	.09#	.16**

All coefficients are standardized.

#  $p < 0.10$ .

\*  $p < 0.05$ ;



.100 > *p*  
\*\*

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